REMARKS

Claims 1-36 are pending. By this Amendment, Claim 14 is amended and new Claims 35 and 36 are added. Reconsideration of the August 13, 2002 Official Action is respectfully requested in view of the following remarks.

Claims 15-17 were rejected under 35 U.S.C. §102(b) over WO 99/50886 ("Schoepp").[1] The reasons for the rejection are stated in numbered paragraph 2 of the Official Action. The rejection is respectfully traversed.

Schoepp does not disclose each and every feature recited in any one of Claims 15-17. Claim 15 recites "a method of plasma conditioning a machined and/or sintered surface of a ceramic part of a semiconductor processing chamber, the part being made of a ceramic material, the method comprising treating the surface to reduce particles of the ceramic material attached to the surface by contacting the surface with a high intensity plasma" (emphasis added). The combinations of features recited in Claims 15-17 and 19-30 are not disclosed by Schoepp for the following reasons.

As recited in Claim 15, the method comprises treating a machined and/or sintered surface of a ceramic part made of a ceramic material. The surface is treated to reduce particles of the ceramic material attached to the surface by a high intensity plasma conditioning treatment. The machining and/or sintering produces particles of the ceramic material that are attached to the surface. Unless these particles are removed from the

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[1]Schoepp does not qualify as a reference under 35 U.S.C. §102(b) against the present application. The present application was filed on June 30, 2000. Schoepp has an effective date of October 7, 1999, i.e., the publication date of the international application (PCT/US99/06658). Accordingly, Schoepp may qualify as a *prima facie* reference under 35 U.S.C. §102(a) against the present application.

surface, they can be a source of particle contamination during processing of semiconductor substrates.

The high intensity plasma treatment recited in Claim 15 reduces the number of particles present on the surface of the part. Absent such high intensity plasma conditioning treatment, significant numbers of particles present on machined and/or sintered surfaces could contaminate substrates in the processing chamber (see, for example, page 10, lines 14-21 of the specification).

The Official Action asserts that Schoepp discloses "treating a SiC surface and reducing particle contamination by supplying process gas to the processing chamber . . . and energizing the process gas into a plasma that comprises high density plasma . . . ." Applicant respectfully submits that Schoepp does not disclose treating a SiC surface and reducing particle contamination as asserted in the Official Action. Schoepp discloses using silicon carbide as a material of one or more reactor surfaces to reduce metal and/or particle contamination of plasma-processed substrates by reducing plasma potential on the silicon carbide member and/or reduced sputtering of non-silicon carbide chamber interior surfaces (page 2, lines 11-26). Schoepp discloses that the silicon carbide materials can be shaped and sintered, but does not disclose treating a shaped and/or sintered surface of the silicon carbide materials by a high intensity plasma processing treatment to reduce particles on the surface. Accordingly, Claim 15 is patentable over Schoepp.

Claims 16 and 17 depend from Claim 15 and thus are also patentable over Schoepp for at least those reasons stated for Claim 15. Withdrawal of the rejection is respectfully requested.

Claim 18 was rejected under 35 U.S.C. §103(a) over Schoepp in view of U.S. Patent No. 5,863,376 to Wicker et al. ("Wicker"). The reasons for the rejection are stated in numbered paragraph 4 of the Official Action. This rejection is respectfully traversed.

Claim 18 depends from Claim 15. The Official Action acknowledges that Schoepp fails to disclose the combination of features of Claim 18. However, the Official Action asserts that Wicker cures the deficiencies of Schoepp as to the subject matter of Claim 18. Without specifically discussing the subject matter recited in Claim 18, Wicker also fails to suggest the plasma conditioning treatment recited in Claim 15. Accordingly, Claim 18 also is patentable over Schoepp and Wicker. Withdrawal of the rejection is respectfully requested.

Claims 1-3, 6-11, 13, 14 and 31-34 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,904,778 to Lu in view of Schoepp. The reasons for the rejection are stated in numbered paragraph 5 of the Official Action. The rejection is respectfully traversed.

Claim 1 recites a method of processing semiconductor substrates and reducing particle contamination during processing of the substrates, wherein "the processing chamber including at least one ceramic part made of a non-oxide ceramic material and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment" (emphasis added). Lu and Schoepp do not suggest the combination of features recited in Claim 1.

As recited in Claim 1, the processing chamber includes at least one part made of a non-oxide ceramic material and having a surface exposed to the interior space of the vacuum processing chamber. The surface has been machined and/or sintered and has been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment. That is, according to the method recited in Claim 1, when the at least one substrate is placed on the substrate holder in the interior space of the vacuum processing chamber, the exposed surface has already been treated to reduce the particles on the exposed surface by the high intensity plasma conditioning treatment. Consequently, when the at least one substrate is processed in the processing chamber (step b), a reduced number of particles are present on the exposed surface of the part.

It is acknowledged in the Official Action that Lu does not teach "a processing chamber including at least one part made of a non-oxide ceramic material, and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment". However, the Official Action asserts that Schoepp discloses a ceramic part made of a non-oxide ceramic material and having a sintered surface exposed to the interior space and that "the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment" (emphasis added). Applicant respectfully disagrees with these assertions.

Lu discloses the formation of SiC films 42 on sintered or hot-pressed SiC 40 that may be shaped (col. 5, lines 38-44 and Fig. 2). Lu discloses that such sintered SiC sintered structures can be mechanism for producing particulate (col. 4, lines 5-9). Lu forms the SiC films by CVD or another film deposition process to provide a surface that is resistant to etching and to particulate formation. The SiC film would cover any particulate on the surface of the sintered or hot-pressed SiC 40. Because Lu's substrate structure is covered by a CVD film, the substrate structure does not include a "surface exposed to the interior space" of a vacuum processing chamber, as recited in Claim 1. Rather, the SiC film covering the substrate structure has a surface that would be exposed to the interior of the reactor chamber.

The Official Action asserts that Schoepp discloses "treating a SiC surface and reducing particle contamination by supplying process gas to the processing chamber . . . and energizing the process gas into a plasma that comprises high density plasma . . . ." However, Schoepp does not disclose treating an exposed machined and/or sintered surface of a ceramic part made of a non-oxide ceramic material and disposed in a vacuum processing chamber to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment before processing at least one substrate in the processing chamber. Thus, Schoepp also provides no motivation to modify Lu to achieve the combination of features recited in Claim 1. Therefore, Claim 1 is patentable over these references.

Dependent Claims 2, 3, 6-11, 13 and 31-34 are also patentable over Lu and Schoepp for at least those reasons stated for Claim 1.

Claim 14 has been rewritten in independent form. Claim 14 recites "the processing chamber . . . including at least one ceramic part made of a non-oxide ceramic material and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment after the part having been installed in the processing chamber, the conditioning treatment comprising treating the exposed surface with a high density plasma while seasoning the processing chamber" (emphasis added). Claim 14 is also patentable over Lu and Schoepp for reasons stated above.

Claims 4, 5 and 12 were rejected under 35 U.S.C. §103(a) over Lu in view of Schoepp and Wicker. The reasons for the rejection are stated in numbered paragraph 6 of the Official Action. The Official Action at page 4 asserts that Wicker discloses a planar antenna, the use of oxygen gas, process parameters and sequential wafer treatment. The rejection is respectfully traversed for the following reasons.

Claims 4, 5 and 12 depend from Claim 1. Without specifically discussing the subject matter of Claims 4, 5 and 12, Wicker also fails to suggest the high intensity plasma conditioning treatment recited in Claim 1. Accordingly, the combinations of features recited in dependent Claims 4, 5 and 12 are also patentable over Lu, Schoepp and Wicker. Therefore, withdrawal of the rejection is respectfully requested.

New Claims 35 and 36 depend from Claims 1 and 15, respectively, and thus are also patentable.

For the foregoing reasons, Applicant respectfully submits that the application is in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

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Marked-up Claim 14

14. (Amended) [The method according to Claim 1, wherein the processing chamber comprises a plasma reactor, the method further comprising a step of conditioning the ceramic part after installation thereof in the processing chamber, the conditioning step comprising treating the exposed surface with a high density plasma while seasoning the processing chamber.] A method of processing semiconductor substrates and reducing particle contamination during processing of the substrates, the method comprising:

(a) placing at least one substrate on a substrate holder in an interior space of a vacuum processing chamber, the processing chamber comprising a plasma reactor and including at least one ceramic part made of a non-oxide ceramic material and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment after the part having been installed in the processing chamber, the conditioning treatment comprising treating the exposed surface with a high density plasma while seasoning the processing chamber;

(b) processing the at least one substrate by supplying process gas to the processing chamber; and

(c) removing the at least one substrate from the processing chamber.